REMARKS

Applicant respectfully requests reconsideration and allowance of the subject application. Claims 2, and 40 have been canceled. Claims 1, 3-39, and 41-57 are pending, of which claims 1, 20, 21-28, 37-39, 46-47, 49, and 54 have been amended.

Replacement Drawings

Applicant submits herewith a complete replacement set of formal drawings (sheets 1-4) to comply with the examiners objection.

35 U.S.C. §101 Claim Rejections

Claims 20, and 37-38 are rejected under 35 USC § 101 as being directed to non-statutory subject matter, specifically non-statutory "computer readable medium" as noted by the Office (*Office Action*, p. 3). The Office argues that lines 23 page 31 to line 8 page 32 of the subject application defines the claimed computer readable medium "as including non-statutory media such as carrier wave, RF, infrared." The Office further argues that the non-statutory media is "incapable of being touched or perceived absent the statutory medium through which they are conveyed." Applicant respectfully disagrees with the Office's argument. Nevertheless, in the interest of advancing the prosecution of these claims, Applicant has amended claims 20, and 37-38 to recite "A tangible computer-readable medium..." As such, claims 20, and 37-38 are allowable. Applicant respectfully requests that the 35 USC § 101 rejection be withdrawn.

35 U.S.C. §103 Claim Rejections

A. Claims 1-13, 15, 20-32, 34, 37-43, 46-51, and 54 are rejected under 35 USC § 103(a) for obviousness over US Patent No. 5,799,173 to Gossler et al. (hereinafter, "Gossler"), in view of US Patent No. 6.728,748 to Mangipudi et al. (hereinafter, "Mangipudi") (*Office Action*, p. 2).

B. Claims 14, 16-19, 33, 35-36, 44-45, 52-53, and 55-57 are rejected under 35 USC § 103(a) for obviousness over Gossler in view of Mangipudi and further in view of US Patent No. 6,321,263 to Luzzi et al. (hereinafter, "Luzzi") (*Office Action*, p. 6). Applicant respectfully traverses the rejections.

Applicant submits that the Office has failed to establish a *prima facie* case of obviousness in rejecting claims 1-57, and Applicant respectfully traverses the rejections.

Independent Claim 1 recites a method performed by a control client that communicates with a load-balancing cluster of server nodes configured to service application-layer requests sent by user clients to a virtual address common to the cluster, the method comprising:

dynamically determining, by the control client, which server nodes are members of the load-balancing cluster;

monitoring application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from outside of the load-balancing cluster application-layer, requests to those server nodes determined to be members of the load-balancing cluster; and

in accordance with the application-layer availability of a server node in the load-balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to

control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the application-layer requests sent by the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to.

Gossler and/or Mangipudi do not teach or suggest the combination of feature(s) recited in claim 1. For example, Gossler and/or Mangipudi do not teach or suggest "dynamically determining, by the control client, which server nodes are members of the load-balancing cluster", "monitoring application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from outside of the load-balancing cluster application-layer, requests to those server nodes determined to be members of the load-balancing cluster" and "in accordance with the application-layer availability of a server node in the load-balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the application-layer requests sent by the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to", as recited in claim 1.

To the contrary, Gossler pertains generally to dynamic workload balancing. Gossler describes a technology for dynamically controlling the number of servers in a transaction system comprising at least one service unit for processing service requests (*Gossler*, Abstract). Each service unit comprises a queue for receiving and queuing the incoming service requests and a plurality of servers for executing the service requests (*Gossler*, col. 2 lines 55-60). A queuing monitor monitors and

controls the servers for each one of the service units of the service point (*Gossler*, col. 3 lines 10 – 21). Further, the queuing monitor provides a dynamic workload balancing method to employ an optimized number of servers for each service unit to be monitored (*Gossler*, col. 4 lines 41-43). The Office cites Gossler for teaching a method comprising determining present members of a load-balancing cluster.

However, claim 1 as amended recites "dynamically determining, by the control client, which server nodes are members of the load-balancing cluster", "monitoring application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from outside of the load-balancing cluster application-layer, requests to those server nodes determined to be members of the load-balancing cluster" and "in accordance with the application-layer availability of a server node in the load-balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the application-layer requests sent by the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to." Gossler fails to disclose the features of claim 1.

In addition to the foregoing, the Office recognizes that Gossler fails to disclose "dynamically determining present members of a load-balancing cluster which includes nodes and a node manager" and "monitoring application-layer availability of one or more members of the cluster, the monitoring being

performed by one or more clients outside of the cluster which are communicatively linked to the node manager in the cluster, such that the monitoring is from a client perspective to detect an error that may impact the application-layer availability as it appears to the one or more clients from outside of the cluster." The Office then relies on Mangipudi as curing the deficiencies of Gossler (*Office Action*, p. 4).

Mangipudi pertains generally to a method and apparatus for policy based class of service and adaptive service level management within the context of an internet and intranet. Mangipudi describes a technology which facilitates categorization and routing of Web traffic based on Class of Service (COS) (*Mangipudi*, Abstract). Mangipudi describes that host computers can be grouped into different clusters (or classes) to facilitate provision of differentiated services. One of these host computers, referred to as the routing host 200, includes a policy engine 210, and is capable of receiving requests from client devices 202 (*Mangipudi*, col. 9 lines 1-6). An incoming request from a client device 202 is received by the routing host 200 which then assigns a class to the request (*Mangipudi*, col. 9 lines 20-25). The policy engine 210 in conjunction with the routing host 200 then distributes the incoming traffic to the most available server 206 for that class (*Mangipudi*, col. 9 lines 20-25).

The Office cites col. 4 lines 28-65 of Mangipudi as teaching "a system of load-balancing which includes nodes and a node manager where the application layer of the servers and their availability are dynamically determined and monitered from a routing host located outside of the cluster." The Office further argues that "the monitoring being performed by the routing host outside of the

cluster which is communicatively linked to the node manager in the cluster, such that the monitoring is from a client perspective to detect an error that may impact the application-layer availability as it appears to the routing host from outside of the cluster." The Office compares an intelligent agent of Mangipudi to Applicants' node manager 110, and compares routing host 200 of Mangipudi to Applicants' one or more clients 132-138 (*Office Action,* p. 4-5; *Mangipudi* col. 4 lines 28-65 and Figs. 2-3).

In Mangipudi, a monitoring engine at a router intercepts requests and communicates with agents at cluster nodes to balance load in the cluster. The router in Mangipudi does not originate requests, nor would this be expected in a router. Furthermore, the router in Mangipudi does not send messages to the cluster to balance load (or, as in claim 1, to control whether a node accepts requests). Rather, the same router performs the load balancing itself by routing requests to nodes according to load balancing needs determined at the router. Because the router performs the load balancing, there is no need to send a message to the cluster to control whether a node accepts requests.

Applicant submits that Mangipudi fails to cure the deficiencies of Gossler. Mangipudi does not describe "dynamically determining, by the control client, which server nodes are members of the load-balancing cluster", "monitoring application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from outside of the load-balancing cluster application-layer, requests to those server nodes determined to be members of the load-balancing cluster" and "in accordance with the application-layer availability of a server node in the load-

balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the application-layer requests sent by the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to", as recited in claim 1.

Accordingly, claim 1 is allowable over the Gossler and Mangipudi combination for at least the reasons described above, and Applicant respectfully requests that the §103 rejection be withdrawn.

Claims 3-13, 15 and 20 are allowable over the Gossler-Mangipudi combination by virtue of their dependency upon allowable claim 1.

Claims 14 and 16-19 are allowable over the Gossler-Mangipudi combination by virtue of their dependency upon allowable claim 1. Claims 14 and 16-19 are also allowable over the Gossler-Mangipudi-Luzzi combination because Luzzi does not address the deficiencies of the Gossler-Mangipudi combination as described above in response to the rejection of claim 1.

Independent Claim 21 recites a method performed by a control client that communicates with a load-balancing cluster of server nodes configured to service application-layer requests sent by user clients to a virtual address common to the cluster, the method comprising:

monitoring application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from outside of the load-balancing cluster application-layer, requests to those server nodes determined to be members of the load-balancing cluster; and

in accordance with the application-layer availability of a server node in the load-balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the application-layer requests sent by the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to.

Gossler and/or Mangipudi do not teach or suggest the combination of feature(s) recited in claim 21. For example as described above in response to the rejection of claim 1, Gossler and/or Mangipudi do not teach or suggest "monitoring application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from outside of the load-balancing cluster application-layer, requests to those server nodes determined to be members of the load-balancing cluster" and "in accordance with the application-layer availability of a server node in the load-balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the application-layer requests sent by

the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to", as recited in claim 21.

Claim 21 has been rejected by the Office for the same reasons as it rejects claims 1 above. Applicant submits claim 21 is allowable over the Gossler-Mangipudi combination for at least the reasons described above in response to the rejection of claims 1.

Claims 22-32, 34 and 37 are allowable over the Gossler-Mangipudi combination by virtue of their dependency upon allowable claim 21.

Claims 33 and 35-36 are allowable over the Gossler-Mangipudi combination by virtue of their dependency upon allowable claim 21. Claims 33 and 35-36 are also allowable over the Gossler-Mangipudi-Luzzi combination because Luzzi does not address the deficiencies of the Gossler-Mangipudi combination as described above in response to the rejection of claim 1.

Independent Claim 38 recites a tangible computer-readable medium having computer-executable instructions that, when executed by a computer, perform a method performed by a control client that communicates with a load-balancing cluster of server nodes configured to service application-layer requests sent by user clients to a virtual address common to the cluster, the method comprising:

dynamically determining, by the control client, which server nodes are members of the load-balancing cluster;

monitoring application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from outside of the load-balancing cluster application-layer, requests to those server nodes determined to be members of the load-balancing cluster; and

in accordance with the application-layer availability of a server node in the load-balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the application-layer requests sent by the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to.

Gossler and/or Mangipudi do not teach or suggest the combination of feature(s) recited in claim 38. For example as described above in response to the rejection of claim 1, Gossler and/or Mangipudi do not teach or suggest "dynamically determining, by the control client, which server nodes are members of the load-balancing cluster" as recited in claim 38. Further, as described above in response to the rejection of claims 1 and 21, Gossler and/or Mangipudi do not teach or suggest "monitoring application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from outside of the load-balancing cluster application-layer, requests to those server nodes determined to be members of the load-balancing cluster" and "in accordance with the application-layer availability of a server node in the load-balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the

application-layer requests sent by the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to", as recited in claim 38.

Claim 38 has been rejected by the Office for the same reasons as it rejects claims 1 and 10 above. Applicant submits that claim 38 is allowable over the Gossler-Mangipudi combination for at least the reasons described above in response to the rejection of claims 1 and 10.

Independent Claim 39 recites a system comprising:

a control client that communicates with a load-balancing cluster of server nodes configured to service application-layer requests sent by user clients to a virtual address common to the cluster;

a dynamic cluster-membership determiner configured to exoclusterly and dynamically determine, by the control client, which server nodes are members of the load-balancing cluster;

an exocluster monitor configured to monitor application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from outside of the load-balancing cluster application-layer, requests to those server nodes determined to be members of the load-balancing cluster; and

in accordance with the application-layer availability of a server node in the load-balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the application-layer requests sent by the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to.

Gossler and/or Mangipudi do not teach or suggest the combination of feature(s) recited in claim 39. For example as described above in response to the

rejection of claim 1, Gossler and/or Mangipudi do not teach or suggest "a dynamic cluster-membership determiner configured to exoclusterly and dynamically determine, by the control client, which server nodes are members of the load-balancing cluster" as recited in claim 39. Further, as described above in response to the rejection of claims 1 and 21, Gossler and/or Mangipudi do not teach or suggest "an exocluster monitor configured to monitor application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from outside of the load-balancing cluster application-layer, requests to those server nodes determined to be members of the load-balancing cluster" and "in accordance with the application-layer availability of a server node in the load-balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the application-layer requests sent by the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to", as recited in claim 39.

Claim 39 has been rejected by the Office for the same reasons as it rejects claims 1, 4, 7, and 10 above. Applicant submits that claim 39 is allowable over the Gossler-Mangipudi combination for at least the reasons described above in response to the rejection of claims 1, 4, 7, and 10.

Claims 41-43 are allowable over the Gossler-Mangipudi combination by virtue of their dependency upon allowable claim 39.

Claims 44-45 are allowable over the Gossler-Mangipudi combination by virtue of their dependency upon allowable claim 39. Claims 44-45 are also allowable over the Gossler-Mangipudi-Luzzi combination because Luzzi does not address the deficiencies of the Gossler-Mangipudi combination as described above in response to the rejection of claim 39.

Independent Claim 46 recites a system comprising:

a control client that communicates with a load-balancing cluster of server nodes configured to service application-layer requests sent by user clients to a virtual address common to the cluster;

an exocluster monitor configured to monitor application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from outside of the load-balancing cluster application-layer, requests to those server nodes determined to be members of the load-balancing cluster; and

in accordance with the application-layer availability of a server node in the load-balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the application-layer requests sent by the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to.

Gossler and/or Mangipudi do not teach or suggest the combination of feature(s) recited in claim 46. For example as described above in response to the rejection of claim 1, Gossler and/or Mangipudi do not teach or suggest "an exocluster monitor configured to monitor application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from outside of the load-balancing cluster

application-layer, requests to those server nodes determined to be members of the load-balancing cluster" and "in accordance with the application-layer availability of a server node in the load-balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the application-layer requests sent by the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to", as recited in claim 46.

Claim 46 has been rejected by the Office for the same reasons as it rejects claims 1, 3-4, 6-7 and 10 above. Applicant submits that claim 46 is allowable over the Gossler-Mangipudi combination for at least the reasons described above in response to the rejection of claims 1, 3-4, 6-7 and 10.

Claims 47-51 are allowable over the Gossler-Mangipudi combination by virtue of their dependency upon allowable claim 46.

Claims 52-53 are allowable over the Gossler-Mangipudi combination by virtue of their dependency upon allowable claim 46. Claims 52-53 are also allowable over the Gossler-Mangipudi-Luzzi combination because Luzzi does not address the deficiencies of the Gossler-Mangipudi combination as described above in response to the rejection of claim 46.

Independent Claim 54 recites a dynamic, active, exocluster monitoring system for monitoring application-layer availability of server nodes in a load-balancing cluster and for controlling an activity state of such server nodes, the monitoring system comprising:

a control client that communicates with a load-balancing cluster of server nodes configured to service application-layer requests sent by user clients to a virtual address common to the cluster;

an app-monitor configured to exoclusterly monitor application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from outside of the load-balancing cluster application-layer, requests to those server nodes determined to be members of the load-balancing cluster; and

in accordance with the application-layer availability of a server node in the load-balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the application-layer requests sent by the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to.

Gossler and/or Mangipudi do not teach or suggest the combination of feature(s) recited in claim 54. For example as described above in response to the rejection of claim 1, Gossler and/or Mangipudi do not teach or suggest "a control client that communicates with a load-balancing cluster of server nodes configured to service application-layer requests sent by user clients to a virtual address common to the cluster", "an app-monitor configured to exoclusterly monitor application-layer availability of the server nodes in the load-balancing cluster, the monitoring being performed by the control client generating and sending, from

outside of the load-balancing cluster application-layer, requests to those server nodes determined to be members of the load-balancing cluster", and "in accordance with the application-layer availability of a server node in the load-balancing cluster as determined by the application-layer monitoring of the control client, sending to the load-balancing cluster a message that is configured to control whether the server node handles application-layer requests sent to the load-balancing cluster by the user clients, where the application-layer requests sent by the control client to monitor application-layer availability conform to a same application-layer protocol that the user client requests conform to", as recited in claim 54

Claim 54 has been rejected by the Office for the same reasons as it rejects claims 1 and 10 above. Applicant submits that claim 54 is allowable over the Gossler-Mangipudi combination for at least the reasons described above in response to the rejection of claims 1 and 10.

Claims 55-57 are allowable over the Gossler-Mangipudi combination by virtue of their dependency upon allowable claim 54. Claims 55-57 are also allowable over the Gossler-Mangipudi-Luzzi combination because Luzzi does not address the deficiencies of the Gossler-Mangipudi combination as described above in response to the rejection of claim 54.

Conclusion

Pending claims 1, 3-39, 41-57 are in condition for allowance and Applicant respectfully requests issuance of the subject application. If any issues remain that preclude issuance of the application, the Examiner is urged to contact the undersigned attorney before issuing a subsequent Action.

Respectfully Submitted,

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